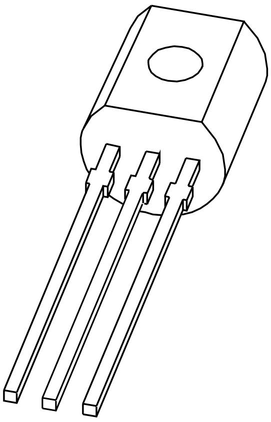
DATA SHEET



PH2369
NPN switching transistor

Product data sheet
Supersedes data of 1999 Apr 27

2004 Oct 11

NPN switching transistor PH2369

FEATURES

- Low current (max. 200 mA)
- Low voltage (max. 15 V).

APPLICATIONS

- High-speed switching.

DESCRIPTION

NPN switching transistor in a TO-92; SOT54 plastic package.

PINNING

PIN	DESCRIPTION
1	emitter
2	base
3	collector

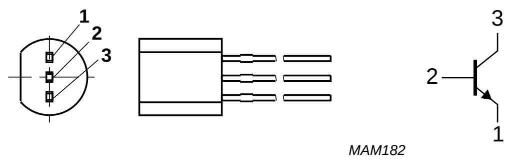


Fig.1 Simplified outline (TO-92; SOT54) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PH2369	SC-43A	plastic single-ended leaded (through hole) package; 3 leads	SOT54

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	40	V
V_{CEO}	collector-emitter voltage	open base	–	15	V
V_{EBO}	emitter-base voltage	open collector	–	4.5	V
I_C	collector current (DC)		–	200	mA
I_{CM}	peak collector current		–	300	mA
I_{BM}	peak base current		–	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	–	500	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	ambient temperature		–65	+150	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j\text{-}a)}$	thermal resistance from junction to ambient	note 1	250	K/W

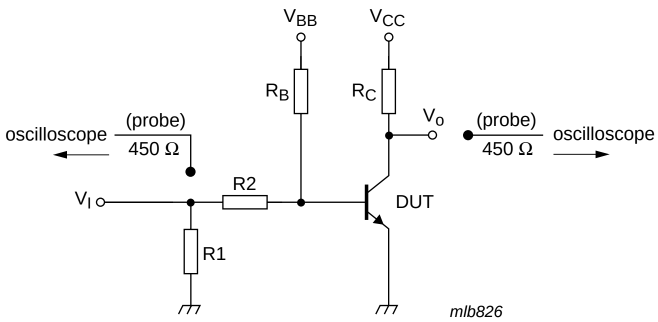
Note

1. Transistor mounted on an FR4 printed-circuit board.

CHARACTERISTICS

T_{amb} = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	V_{CB} = 20 V; I_E = 0 A	–	400	nA
		V_{CB} = 20 V; I_E = 0 A; T_j = 125 °C	–	30	μA
I_{EBO}	emitter-base cut-off current	V_{EB} = 4 V; I_C = 0 A	–	100	nA
h_{FE}	DC current gain	V_{CE} = 1 V; I_C = 10 mA	40	120	
		V_{CE} = 1 V; I_C = 10 mA; T_{amb} = –55 °C	20	–	
		V_{CE} = 2 V; I_C = 100 mA	20	–	
V_{CEsat}	collector-emitter saturation voltage	I_C = 10 mA; I_B = 1 mA	–	250	mV
V_{BEsat}	base-emitter saturation voltage	I_C = 10 mA; I_B = 1 mA	700	850	mV
C_c	collector capacitance	V_{CB} = 5 V; I_E = i_e = 0 A; f = 1 MHz	–	4	pF
C_e	emitter capacitance	V_{EB} = 1 V; I_C = i_c = 0 A; f = 1 MHz	–	4.5	pF
f_T	transition frequency	V_{CE} = 10 V; I_C = 10 mA; f = 100 MHz	500	–	MHz
Switching times (between 10 % and 90 % levels)					
t_{on}	turn-on time	I_{Con} = 10 mA; I_{Bon} = 3 mA; I_{Boff} = –1.5 mA; see Fig.2 test conditions A	–	10	ns
t_d	delay time		–	4	ns
t_r	rise time		–	6	ns
t_{off}	turn-off time		–	20	ns
t_s	storage time		–	10	ns
t_f	fall time		–	10	ns
t_{on}	turn-on time	I_{Con} = 100 mA; I_{Bon} = 40 mA; I_{Boff} = –20 mA; see Fig.2 test conditions B	–	13	ns
t_{off}	turn-off time		–	35	ns



Test conditions A.

V_i = 0.5 to 4.2 V; T = 500 µs; t_p = 10 µs; $t_r = t_f \leq 3$ ns.

R1 = 56 Ω; R2 = 1 kΩ; R_B = 1 kΩ; R_C = 270 Ω.

V_{BB} = 0.2 V; V_{CC} = 2.7 V.

Oscilloscope: input impedance Z_i = 50 Ω.

Test conditions B.

V_i = 0.5 to 4.52 V; T = 200 µs; t_p = 10 µs; $t_r = t_f \leq 3$ ns.

R1 = 100 Ω; R2 = 68 Ω; R_B = 390 Ω; R_C = 47 Ω.

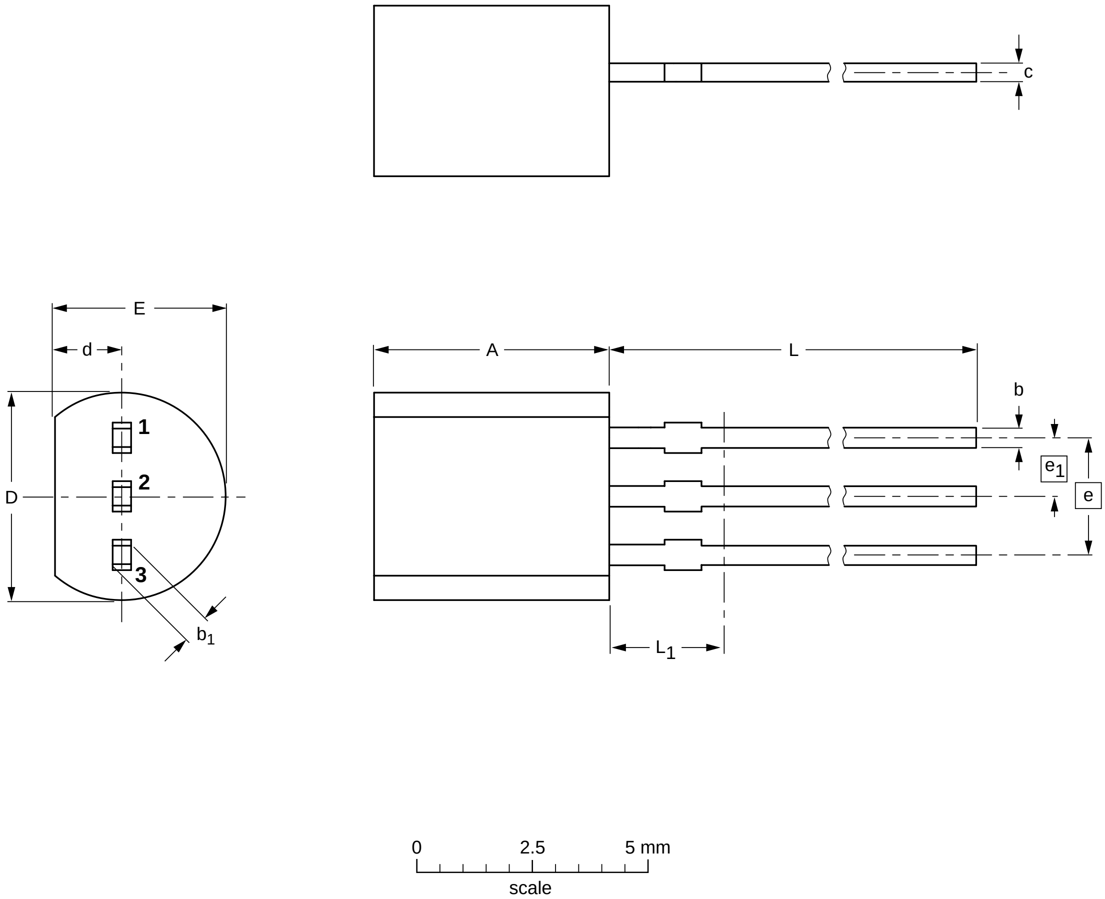
V_{BB} = −3 V; V_{CC} = 4.6 V.

Oscilloscope: input impedance Z_i = 50 Ω.

Fig.2 Test circuit for switching times.

PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads **SOT54**

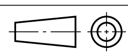


DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b_1	c	D	d	E	e	e_1	L	L_1(1) max.
mm	5.2 5.0	0.48 0.40	0.66 0.55	0.45 0.38	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT54		TO-92	SC-43A			~~04-06-28~~ 04-11-16

NPN switching transistor PH2369

DATA SHEET STATUS

DOCUMENT STATUS(1)	PRODUCT STATUS(2)	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

Notes

1. Please consult the most recently issued document before initiating or completing a design.
2. The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

NXP Semiconductors

Customer notification

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

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Printed in The Netherlands R75/04/pp7 Date of release: 2004 Oct 11 Document order number: 9397 750 13616

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